been described that it seems not useless to give again a summary of the two larger genera of the group. This is an enormous western genus, numbering 95 species, seven of them being described for the first time in this contribution, six by Mr. Watson, and one by Prof. Porter. *Chorizanthe*, a polymorphous genus, with which the genus *Centrostegia* is united, numbers 25 species, six of which are here described for the first time. Besides these three, twenty other genera have received an accession of species. *Amarantus* has received five new species; *Habenaria*, three; *Lavatera*, *Lupinus*, *Œnothera* and *Elaterium*, each two; *Thelypodium*, *Malvastrum*, *Psoralea*, *Lythrum*, *Mentzelia*, *Angelica*, *Mirabilis*, *Abronia*, *Rumex*, *Oxytheca*, *Atriplex*, *Corallorhiza*, *Sisyrinchium* and *Erythronium*, each one.

Catalogue of the Society for the Exchange of Plants, Budapest, Hungary, 1876.—This catalogue is of large dimensions and contains some very valuable plants. Richter Lajos especially desires to receive *Rosa*, *Rubus*, *Orchis*, *Scleranthus*, *Hieracium*, *Elatine*, *Viola*, *Primula*, *Salix*, *Verbascum*, *Pulsatilla*, and *Polygonum aviculare*.

Proceedings of the Academy of Natural Sciences of Philadelphia, Part I.—January, February, and March, 1877.—The botanical papers are not numerous or lengthy. The first paper is the termination of a little discussion begun and carried on in *Nature* by Dr. Gray and Thos. Meehan in reference to the fertilization of *Browallia elata*. The next paper of botanical interest is a List of Ballast Plants in the neighborhood of Philadelphia, by Isaac Burk. The list numbers 125 species, giving the locality of each and also its native habitat except when it belongs to the British coasts. M. C. Cooke has a paper on the *Valsei* of the United States. Among the *Valsei* he includes the names of only two genera, namely, *Valsa* and *Melanconis*. The paper is presented as a contribution towards the more complete and satisfactory knowledge of the Fungi of the United States. *Valsa* numbers 133 species, and *Melanconis* five. Mr. Meehan also has some short papers, or rather notes, on "Influence of Nutrition on Fertilization," "The Bluebird and Holly Berries," "Vitality of Seeds under Low Temperature," and "Evolutionary Law, as Illustrated by Abnormal Growth in an Apple Tree."

American Naturalist, July.—*Habenaria rotundifolia* must be called *Orchis rotundifolia*, as after examination of live plants sent to the Botanic Garden, Dr. Gray has found the plant to be a genuine *Orchis* and a true congener of *O. spectabilis*. Dr. J. H. Mellichamp has a note recording some late observations made by him upon the intoxicating power of the sweet secretion of *Sarracenia variolaris*. In 1874 he had stated that the sweet secretion was simply a lure to insects and not stupefying or intoxicating, but another observer having arrived at conclusions directly opposite, fresh experiments were made which resulted in the same conclusions that were first arrived at. Dr. Mellichamp also sent two phials of the fluid found at the bottom of the Sarracenia tubes. Experiments were made in the Botanical Laboratory and confirmed the following statement made by Dr. Mellichamp: "Pour out a teaspoonful or two of the fluid in an ounce measure, or a small wine glass. Throw in a fly so that his wings will be wet or slimed. He will in a few minutes cease to struggle and will apperr as if dead. Take him out after a while and let him dry, and in about half an hour he will revive." The experiments with the fluid are still in progress, and we are promised the detailed results in the August Naturalist.

THE GERMINATION OF THE GENUS MEGARRHIZA, TORR.; *by Asa Gray*.—The following article is of such general interest that we quote it entire from the *Am. Jour. of Science and Arts* for July:

"The object of this brief communication is to describe a peculiar strucrure which *Megarrhiza Californica* exhibits in germination, and to call for observatious upon other species, at the time of germination, in the hope of thereby extending our present imper-

fect knowledge of this genus of big-rooted *Cucurbitaceæ* of our Pacific coast. For the extraordinary peculiarity in question, being one which, in other cases, is known to exhibit itself in certain species of a genus (as in *Anemone* and *Delphinium*), and not in others, so it may in the present genus give aid in distinguishing the five species which have been characterized upon more or less incomplete or scanty materials.

"The first species known was from Oregon; the specimens, being in flower only, were referred in Hooker's Flora Borealis Americana, i, 220, to *Sicyos Angulatus*, but were separated in Torrey and Gray's Flora of North America, i, 542, under the name of *Sicyos Oreganus*. In the course of time it was found that there was a similar if not identical species in California, and apparently more than one, that they were perennial from very large and fleshy roots, that, while the flowers much resemble those of *Echinocystis*, the seeds were turgid, marginless, and with thick and fleshy cotyledons. Dr. Torrey, upon whom the examination of these plants devolved, many (about thirty) years ago proposed for them the generic name of *Megarrhiza;* but he refrained from publishing it, even omitted all mention of it in his account of Dr. Bigelow's excellent collection made in Whipple's Expedition (Pacif. R. Rep. iv, 1857), although good materials of that and other collections were in his hands, because he could not make up his mind whether he had to do with one variable species or with two or three. But in the sixth volume of the Pacif. Railroad Rep., which bears the same date of 1857, in Dr. Newberry's list of plants collected in Williamson's Expedition (p. 74), two species are enumerated, thus:

"*Megarrhiza Californica*, Torrey. Petaluma and Sonoma, California; April, in flower.'

"*Megarrhiza Oregana*, Torrey. On the shores of Klamath Lake and banks of Willamette River, O. T.; August and September, in fruit."

"Before this, however, viz: in March, 1855, Dr. Kellogg, of San Francisco, communicated to the California Academy of Natural Sciences (Proc. Calif. Acad., i, 38), an account of one of these species, apparently the second, under the name of *Marah muricatus*.

"A few years later, some plants having been raised in France from Californian seeds, M. Naudin (in Ann. Sci. Nat., ser. 4, xii, 154, t. 9, under date of 1859, but, as the letter-press shows, not printed until 1860 or 1861), published the plant which Dr. Torrey had called *M. Californica* under the name of *Echinocystis fabacea*. This extension of *Echinocystis* was adopted by Bentham and Hooker in their Genera Plantarum. It was, moreover, anticipated by Dr. Kellogg, who, in a second communication to the California Academy, under date of June 4, 1855, re-describes his former *Marah muricatus*, states that it 'legitimately belongs to *Echinocystis*,' and gives it the name of *E. muricatus*. When, shortly after Dr. Torrey's death, I superintended the printing of his account of the plants collected on our Pacific coast in Wilkes' Expedition, I found that he had left the article on this genus unwritten, and apparently had not determined either upon the number of the species or upon the distinctness of his proposed genus.

"When in the recent preparation of the Botany of California the subject came to be studied anew by Mr. Watson, with the aid of more extensive materials, and when these materials were found to exhibit such diversities that at least five species had to be recognized (Bot. California, i, 240), with notable differences in ovary, fruit, seeds, etc., but no approximation to the eastern *Echinocystis*, it could hardly be doubted that Torrey's genus ought to be reinstated; and this was accordingly done.

"The *M. Californica* had been raised in the Botanic Garden of Harvard University many years ago, but I had not seen the germination; and we were never able to bring the plant into blossom, as it invariably died down to the ground soon after making a moderate growth. On germinating some fresh seeds early this spring, I was somewhat surprised to find that they came up in the manner of beans. Instead of remaining

hypogæous, as from the great thickness of the cotyledons would have been expected, the body of the seed in its shell was raised well out of the soil upon what seemed to be a well developed radicle, like that of *Echinocystis*. If the cotyledons had expanded, though remaining fleshy, in the manner of *Phaseolus*, the difference between this and *Echinocystis*, with cotyledons truly foliaceous in germination, would be much less than had been supposed. I waited long to see if this would occur; I also waited in vain for the expected development of the plumule from between the bases of the fleshy cotyledons. After the lapse of about a fortnight, the plumule in all three of my germinating plantlets came separately out of the soil of the pot; and, on exposing the whole to view, the following state of things came to view: The plumule came forth from the base of what appeared to be an elongated radicle (of two or three inches in length); and below this the thickening of the root, which acquires enormous dimensions in old plants, had already commenced. A large amount of the nourishing matter stored in the cotyledons had been carried down to the root and used in its growth as well as that of the plumule. The latter came from a cleft at the very base of the seeming radicle, which otherwise appeared to be solid. But on cutting it across toward the base this was found to be tubular; and later, when more spent and beginning to wither, this stalk was separable from above downward into two.

"This, therefore, is a case in which long petioles to the cotyledons (of which there is no appearance in the seed), connate into one body, are developed and greatly lengthened in place of the radicle, which is thus simulated. It is the same as in *Delphinium nudicaule* of California, and some other species; only in that genus the cotyledons expand and become foliaceous. In the horse-chestnut petioles are also developed to the cotyledons to a moderate extent, but without union, (see Gray's First Lessons, fig. 24), thus pushing the radicle and plumule well out of the firm seed-coat, in which the very heavy and fleshy cotyledons remain; and the radicle itself, as in the pea, does not further lengthen. In *Ipomœa leptophylla* the radicle remains in like manner short, while petioles to the (here foliaceous) cotyledons develope to a great length, bringing these separately out of the ground, and the plumule between follows later.

"Botanists on the Pacific coast are earnestly requested to examine the germination of all the species of *Megarrhiza*, and to compare them with the description here given. At least three species should be met with near San Francisco, and in neighboring parts of California. According to the characters assigned by Mr. Watson in the Botany of California, *M. Californica* should be known by its obovoid seeds, of less than an inch in length, with a small hilum at the narrow base: *M. Marah*, by its more numerous seeds horizontally imposed in a large fruit (of four inches in length), each seed roundish and depressed, flattened, an inch in diameter and about half as thick, with a prominent lateral hilum. *M. muricata*, by a nearly naked fruit only an inch in diameter, containing only two globose seeds of half an inch in diameter. *M. Oregana*, which is known to occur from the Columbia River to the north of California, appears to have seeds resembling those of *M. Marah*, but rather smaller; but they are not well known. The remaining one, *M. Guadalupensis*, of Guadalupe Island, off Lower California, is much out of ordinary reach, unless it should be found in the southern part of the State. Mature fruits and seeds of all the species are much desired."

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